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ABSTRACT

The material in this volume was developed for use in a series of workshops on institutional research and planning for colleges and universities. The workshop sessions made extensive use of computers. This was made possible through the use of PLANTRAN II, a computer simulation system designed to make the power of the computer available to the higher education executive without special computer knowledge. Although the material in this manual exploits the capabilities of the PLANTRAN system, computer processing is not required for use of the models. Eight basic techniques of projecting enrollments are reviewed. These generalized techniques can be applied to any type of institution and to any type of enrollment. The crucial task is the matching of projection methods with the objective of the projection effort, which requires the judgment of a knowledgeable administrator. (Author/WM)

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PLANTRAN II

A
COMPUTER ASSISTED INSTITUTIONAL RESEARCH & PLANNING SYSTEM

SAMPLE APPLICATION

ENROLLMENT PROJECTIONS

MRI

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Techniques

of

Institutional Research and Long Range Planning

for

Colleges and Universities

-- Enrollment Projections

Economics and Management Science Division

Midwest Research Institute

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PREFACE

The material in this volume was developed by MRI for use in a series of workshops on institutional research and planning for colleges and universities. These workshops were conducted by MRI during the 1971-1972 academic year. These workshops were designed to address real planning problems. Participants were encouraged to collect and use data from their own institutions. As a result, participants not only learned research and planning techniques but also developed analyses which were immediately useful to institutional decision makers.

The workshop sessions made extensive use of computers. This was possible through the use of PLANTRAN. This is a computer simulation system developed by Midwest Research Institute. It was designed to make the power of the computer available to the higher education executive without special computer knowledge. It is in use by several dozen institutuion of all levels and sizes.

While the material in this manual exploits the capabilities of the PLANTRAN system, computer processing is not required for use of the models. The techniques can all be implemented manually.

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Approved for:

MIDWEST RESEARCH INSTITUTE

John McKelvey
Vice President
Economics and Management Science Division

cae

II. Enrollment Projections

A. Relation to Overall Planning

1. Role of enrollment projections: College is an organization designed to provide educational services to students. The number and type of students are important in shaping the educational services provided by the college. Accurate projections of enrollments in colleges and universities are the key to institutional planning. Projection of enrollment is analogous to sales forecasting for a manufacturing firm, i.e., from this one planning factor come many implications. Enrollments influence the number and type of faculty, curricular offerings, research and teaching laboratories, student activities, student housing, student health care, food services, academic facility construction, and many other elements of campus administration that must be carefully planned in advance of need.

A college's enrollment is the major determinant of both resource requirements and resource availability. Resource requirements are usually developed by the application of a variety of planning factors to enrollment. Both philosophically and analytically the main driving force behind a college's resource requirements is the demand* for services made by students. The number of students also has a major impact on the college's income. This is clearly apparent in the case of a private college or university which is typically heavily dependent upon tuition income. Even in the public sector, however, a large portion of a university's income is tied to students. An example is a state university which is funded with a formula based on dollars per full time equivalent students.

Figure 1 displays the relationship between enrollment projections and the total planning effort. Anyone trying to develop long range plans for a college must give his first attention to projections of enrollment.

2. Projections, estimates, goals: In dealing with the future it is helpful to keep in mind the distinction between three terms: projections, estimates, and goals. Projections are statements about future events on a long run basis. Typically they describe activities over multi-year periods and are not used as precise predictions of actual events but to indicate trends and long term developments. The central concern with projections, then, is the magnitude, direction and rate of change. An enrollment projection over five years which did not hit the exact figures but which did accurately describe the direction and pace of change would be considered a good projection. For example, if the projection shows the enrollment going down at a rapid rate, the administrator must take this into account in his planning for resource requirements and income. As one moves further out in time, amount of precision possible and its importance decline. As long as the projections are based on accurate trends, long range planning will be realistic.

* "Demand" is used throughout this section in the economic sense of "the desire to purchase coupled with the ability to do so."

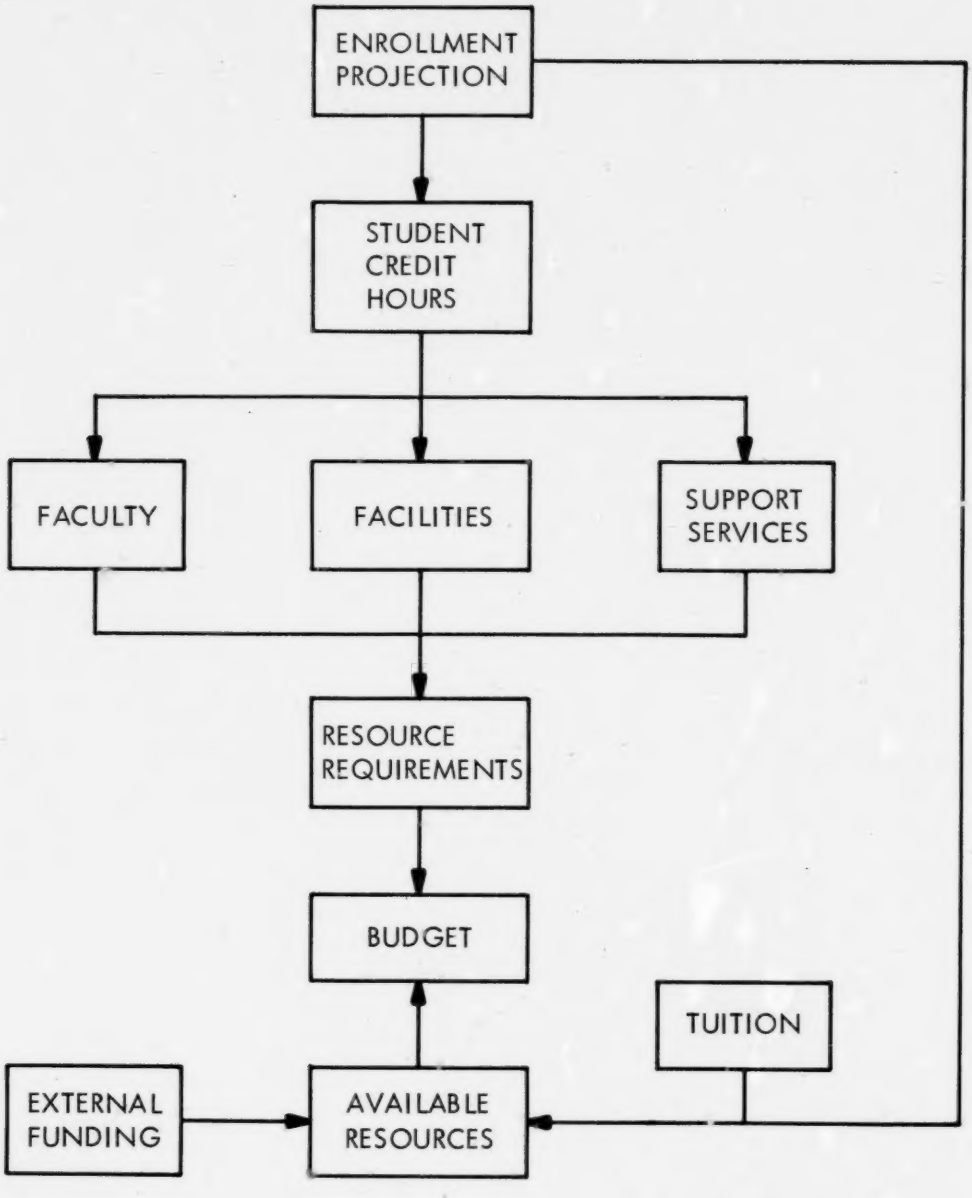
ENROLLMENT PROJECTION
STUDENT CREDIT HOURS
FACULTY
FACILITIES
SUPPORT SERVICES
RESOURCE REQUIREMENTS
BUDGET
TUITION
EXTERNAL FUNDING
AVAILABLE RESOURCES

Figure 1

An estimate is a statement about short-run future events. Typically these will be monthly forecasts. Since enrollment does not significantly change from month to month, enrollment estimates are statements about next year's enrollment. In this case, the administrator is much more interested in the exact number of students since specific and critical decisions will follow from it. The more precise the estimate, the more precise the budget and staffing decisions can be. Trends, direction of change, and pace of change are not the direct concern of estimates.

Projections and estimates have different purposes and generally utilize different data in developing their forecasts. Since it is long-run, a projection will be based on trend data from the past: numbers of students, percent of college attendance, share of market, etc. Estimates result from leading indicator research. What can the administrator look at in January which will give him a precise estimate of the number of students to be enrolled next fall. This kind of research looks at admissions and retention data: number of applications, enquiries, acceptances, deposits, pre-registrations, transcript requests, etc.

Goals are statements of desired future events. An administrator develops a plan to achieve his goal and implements that plan. He builds in analysis points along the way so that he can monitor the progress of the plan and make statements about the probability of achieving his goal. A goal can either be long-run or short-run. Often a goal is set after a projection or estimate has been made because the projected results are unacceptable to decision makers.

It is important to keep projections and goals separate particularly in enrollment projections. While a planner might like a certain enrollment by 1980, he should not use that as the basis for his operating budget if the long run trend indicates a substantially lower enrollment. At the minimum, he should be aware of the conflict between the two.

B. Theory of Enrollment Projection

Most enrollment projections assume that there is relative stability in the factors controlling enrollment. This stability rests on the interrelatedness of time periods. Some relationship between the enrollment this year and last year is assumed. This stability results in some predictability about future events.

Figure 2 displays a generalized model of enrollment projection. The projection results from four factors: demographic (essentially population), historic trends, policy constraints, judgment.

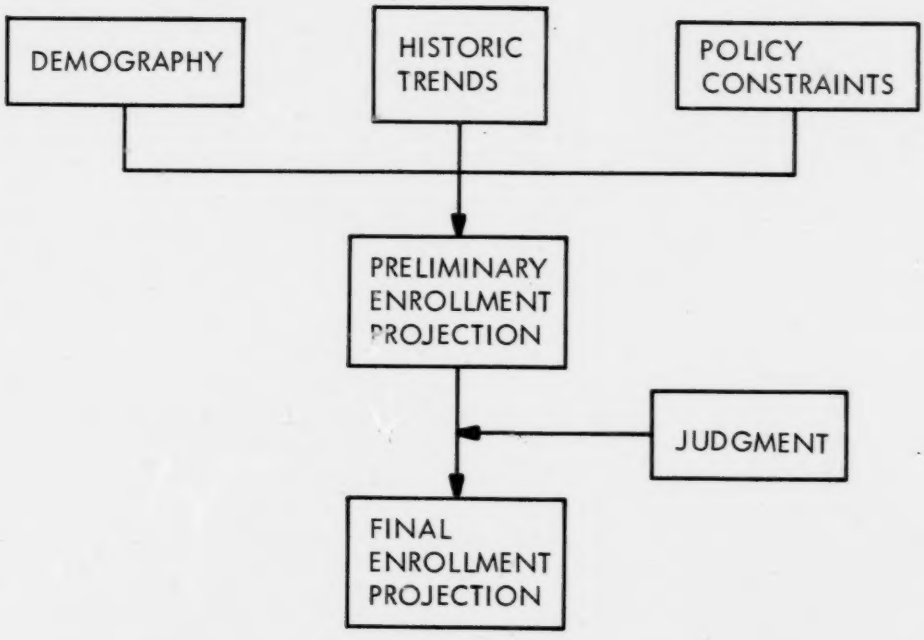
DEMOGRAPHY
HISTORIC TRENDS
POLICY CONSTRAINTS
PRELIMINARY ENROLLMENT PROJECTION
JUDGMENT
FINAL ENROLLMENT PROJECTION

Figure 2

1. Demographic: The demographic information refers to the pool of students from which enrollment at a particular institution will come. It also includes socio-economic characteristics which will affect college attendance as well as type of educational service required. This information will vary from institution to institution. For one it might be births 18 years previous; for another number of high school seniors the previous year; for another the number of baptisms in a particular religous denomination 18 years previous. This tends to be relatively hard data since the people who form the pool already exist and can generally be counted. The size and composition of the pool are the critical problem areas.

2. Historic trends: Historic trends relate to the number and rate of attendance of students in previous years. Past attendance can be viewed as a percentage of the pool or can be compared with the attendance in other years. This last method has serious shortcomings since it fails to relate enrollment to the basic demographic and population situation. These trends can be subjected to a variety of statistical analyses to determine metnods of future projection.

3. Policy constraints: Policy constraints can be major determinants of enrollment. For example a college which has a limit on student capacity and which decides not to expand that capacity has placed a constraint upon enrollment: an upper limit. Changes in fee and tuition policy, expansion into new student markets, increase in student financial aid, changes in program offerings to appeal to more students, launching a new admissions effort, starting up a branch campus, development of a low tuition institution nearby, these are all examples of the type of policy constraints which will have an impact on enrollment above and beyond the population and historic trends.

4. Judgment: The professional judgment of knowledgeable college administrators is a valuable input to an enrollment projection. A person who has a good "feel" for his institution can make contributions to any research program, including enrollment projections. Typically these inputs are in the form of parameters. Such a person may react by saying that a certain projection is too low, another is too high. These types of judgments should be included in the projection.

The result of this process is that the projection of a college's enrollment is not a pure research exercise. It is administrative problem solving and should make use of all available data and expertise. Most of all it should be open to the professional judgment of key decision makers and should produce output in a form and of a nature which can be effectively used by these decision makers.

5. Inter-relationships: A theory of enrollment projection must also take into account the inter-relatedness of colleges and universities. The enrollment of a low cost community college will affect the enrollment of four-year colleges in the same area. Increased recruiting by a college does not significantly increase the total number attending college, but it will increase that college's share of those who attend. In other words, increased attendance at one college means decreased attendance somewhere else.

C. Techniques of Enrollment Projection

This section will review eight basic techniques of projecting enrollments.* These generalized techniques can be applied to any type of institution or groups of institutions and to any type of enrollment. The crucial task is the matching of projection methods with the objective of the projection effort. This requires the judgment of a knowledgeable administrator.

1. Trend analysis

The most logical and simple model for projection is to review the past behavior of the variable to determine if there are any stable trends and to further determine if the underlying causes of this past behavior will continue in the future. If both of these conditions are met a simple time series analysis may be all that is needed for the projection. For example, if freshman enrollment has been increasing 5 percent a year for the last ten years and if it is reasonable to assume that things will be pretty much the same for the next ten years, a five percent annual increase in the freshman class is a reasonable projection.

The weakness of this approach is that the real world seldom conforms to this model. Such a condition may be true in a short-run situation but rarely in the long-run. The type of social, economic, and educational changes which have occured in the United States in the last five years underscore the difficulty in justifying this type of approach.

Even if more sophisticated, non-linear models are used, the growing discontinuity between past and future vitiate their usefulness. Most planners have an intuitive feeling about the determinants of enrollment: population, economic conditions, cost, location, competition. They are also fairly confident that most of these factors will be changing through time and probably not according to past patterns of change.

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* The discussion of the first five techniques draws from a similar section in Methodology of Enrollment Projections for College and Universities, by L.J. Lins (March, 1960).

2. Ratio method

This method concentrates on one determinant of enrollment: population. In essence it says that the enrollment of a college can be viewed as a ratio of a population grouping. The particular grouping will vary with each college. It has two parameters: age and geographic area. For the typical college, the population grouping will correspond to the normal college attendance age: 17 through 22 years of age. While this group does not account for all students enrolled, it will typically account for the vast majority. The geographic area will depend upon the college. A few universities draw from a national student pool, but most colleges and universities have a geographic region which produces most of their students. The area may be as small as a county in the case of a community college or as large as an entire state in the case of a public university. The fact that commuting distance is a variable in choice of college means that most schools have a major drawing or market area.

Once the age and the geographic area parameters have been determined, counts of the population are developed and compared with actual enrollment for the same time periods. The resulting ratio then becomes the basis for projecting future enrollments. The ratio can be subjected to various types of trend analysis to produce ratios for a future time series. This projected ratio is then applied to projections of population in the base grouping. The projected ratio is subject to the application of judgement and may be modified for valid, non-statistical reasons.

3. Cohort survival: This technique of enrollment projection uses a series of ratios to develop projections of enrollment on a grade by grade basis. It follows a group of students through the complete educational system and calculates the number that continue on each year. For example, the number of second graders is some ratio of last year's first graders. This year's third graders are some ratio of last year's second graders, and so on. The ratios are developed by analyzing past experience with grade to grade retention. Theoretically, this procedure, can be followed through elementary, secondary, collegiate, and post-graduate education. In practice the entire series is rarely constructed for projection purposes because of the lack of good data and the large amount of data to be manipulated when it is available.

4. Combined ratio and cohort survival: This technique combines the last two methods we have discussed. The combination is of this form. The ratio technique is used to project the size of the entering freshman class. The projections of the sophomore, junior, and senior classes utilize the cohort survival technique by applying ratios to last year's freshman class to produce this year's sophomore class; applying ratios to last year's sophomore class to produce this year's junior class, and so on. Graduate enrollments can be generated by defining the cohort as the bachelor recipients of the last two years within a defined geographic area depending upon the present geographic composition of the graduate enrollment.

5. Correlation analysis: This is a more sophisticated technique for determining statistically valid relationships between enrollment (dependent) and one or more causal factors (independent). This type of analysis is often a helpful addition to any of the methods discussed above. To effectively use this technique, the sample size needs to be relatively large and the data as accurate as possible. Often data on the independent variables are difficult to accumulate in a form that lends itself to this analysis. One has the further problem of forecasting the independent variables which may require a substantial research effort.

6. Share-of-the-market:

This technique approaches the problem of projecting enrollment in a fashion similar to that of a firm seeking to forecast sales. It is a two-step process of first determining the size of the market and then the individual firm's share of that market. For enrollment projections, the two steps are: first, to determine the number of students attending college under appropriate age and geographic parameters and second, to determine what proportion of those will attend the individual college. This proportion will be changing through time and part of the projection problem is to forecast the college's future share. This approach is displayed in figure 3. The population cohort, the propensity of college attendance, and the college's share determine the projected enrollment.

The first step requires projections of the population cohort. This can be developed through births 18 years previously adjusted for mortality and migration (essentially the cohort survival method applied to age groups), twelfth grade enrollments, and projections based on census data often available from external sources. The first step also requires a determination of the proportion of the age cohort which is likely to attend college. This can be developed by a time series analysis, correlation analysis, and other techniques. It is often helpful to develop attendance rates for different segments of higher education: junior college, private four year, and tax supported colleges. The appropriate factors can be developed through a historic analysis.

The second step involves the calculation of the expected share of the particular institution. Again historic analysis and judgment will provide the factors to be used. This can be applied against the total college attending group or more realistically against the specific market of the institution. Thus a junior college would determine its share of the total number attending junior colleges; a private college would determine its share of the total projected to attend private colleges. Since there are identifiable factors associated with each of these sectors, a discriminate approach is justified.

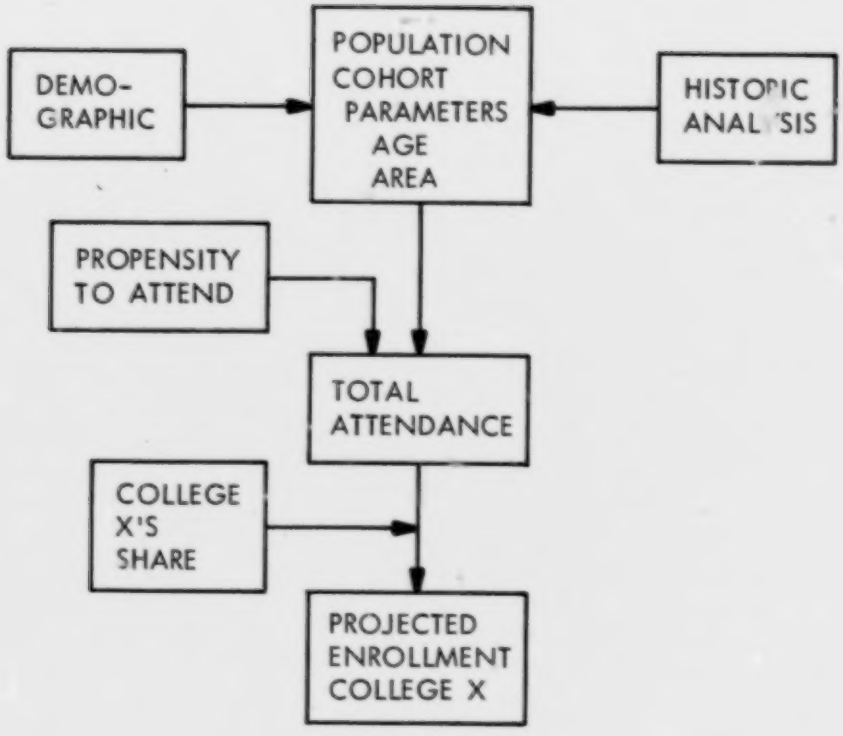
DEMO-
GRAPHIC
POPULATION
COHORT
PARAMETERS
AGE
AREA
HISTORIC
ANALYSIS
PROPENSITY
TO ATTEND
TOTAL
ATTENDANCE
COLLEGE
X'S
SHARE
PROJECTED
ENROLLMENT
COLLEGE X

Figure 3

7. Forced balancing: This technique can be used with any of the above projection techniques but is most applicable to the share-of-the-market method. It is based on a recognition of the fact that the market for any one school is finite. The total number of people who will seek higher education is not significantly affected by the recruiting and marketing efforts of individual colleges. Colleges can increase, maintain, or decrease their share of the total market but cannot expand or contract the market. This means that a college can increase its share of the market only at the expense of the other colleges competing in the same market.

During the sixties this was not so apparent since the enrollment of all colleges was increasing. This, of course, was due to the rapid expansion of the total market, not to the expansion of the share of all institutions. In fact it is now clear that one group, private colleges, was losing its share of the market while the public sector share was increasing. The rapid growth in the size of the market offset this reduction in market share of the private colleges.

With this experience, the inter-relationship between colleges must be recognized in enrollment projections. This is especially critical in forecasts of enrollment for groups of institutions, statewide enrollments, for example. A forced balancing routine ensures that changes in enrollment for individual colleges will not cause changes in the total size of the market.

In mathematical notation we would say that

$$\sum (E_i + \Delta_i) = TE$$

when; TE - Total Enrollment for all of the class or group of institutions in question. This might be obtained, for example, from age cohort population and propensity data.

E_i = Enrollment, college i

Δ_i = Subjection, judgemental, quantitative

adjustments to the Enrollment estimates, college i.

Then E_i', the final, adjusted enrollment estimate for college i would be calculated thus:

$$E_i' = \left(\frac{TE}{\sum E_i + \Delta_i} \right) E_i$$

8. Disaggregation techniques: Once gross enrollment projections have been made, the planner faces the problem of breaking down his total number into the various categories and levels required for further planning and decision-making. The most straight-forward method is to review the past record of constituent elements. For example, if the planner needs to project the number of men and women in the total enrollment, he can analyze the past ratios and subject them to a trend analysis. This is another area in which a good deal of informed judgment can be applied. The criteria for deciding whether to disaggregate enrollment and the degree to which this should be done is the use of this information in further planning and decision-making. It is easy to spend a great deal of time producing a mass of information which is never really used. The time spent in accumulating that information is thus not justified.

9. General considerations:

a. Objective of the projection: The first decision in conducting a projection study is to determine its objective. While this might seem simple, it often is not. An objective of "forecasting future enrollments" is not specific enough to guide design decisions. The following types of questions need to be answered:

--Over how long a period are the projections to be made?
--Whate type of enrollment is to be projected: undergraduate, graduate, adult education, part-time, full-time?
--To what level of detail should the projections go: sex, department, in-state, out-of-state, academic classification?
--Under what policy constraints?
--Who will receive the projections and how will they use them?

Objectives stated in this specific fashion will enable the planner to make better decisions on the type of projection technique to use, the level of disaggregation, and the amount of effort required.

b. Judgment: The judgment of knowledgeable individuals is a resource to be used in the projection. Initially professional judgment is applied to the selection of the projection technique. Some methods are appropriate in some situations and inappropriate in others. The matching of technique with the problem to be solved is an art which improves with experience.

c. Ideal versus real: The design and objectives of a projection study will typically be ideal ones which will be difficult to implement. The model might call for information which is not available or which will be very difficult and thus expensive to obtain. These ideal designs serve as guides for future developments and expansions of the study. The planner will usually have to do the best job he can with the data he has available. The ideal procedure will highlight data gaps and stimulate a list of priorities for further work.

d. Junior colleges: While the sample analysis is designed for a four-year college, the adaptations needed for an analysis of junior college enrollment are evident. The analysis of juniors and seniors will be omitted and analyses of speical types of enrollment will be added. These include adult education, vocational-technical, and other special purpose programs. Adult education enrollment can be viewed as a percentage of district population over compulsory school attendance age who are not full time students.

Vocational-technical and other occupational programs often have maximums placed on enrollments or are otherwise under policy constraints. Manpower planning can be applied to these areas more easily than to the traditional college programs. Projected needs for certain types of manpower can be translated into enrollments in appropriate programs.

e. Graduate enrollment: Since the sample analysis is designed for undergraduate enrollments, modifications will have to be made to deal with graduate enrollments. Graduate education is not as free a market as undergraduate education. Program, facility, and financial constraints lead to careful screening of applicants and enrollment lids. Often these policy constraints will make a projection unnecessary.

If a projection is needed, it will proceed within the same framework as the undergraduate. A share-of-the-market methodology can be used. The population pool can be defined by three parameters: recipients of bachelor's degree over X number of years within a defined geographic area. The size of the market will be the proportion of that grouping which takes graduate work. The individual institution will have a "share" of that market.

II. Enrollment Projection Case Studies

A. Enrollment Analysis

1. Analysis of Planning Matrix

2. Summary Reports

a. Overview Line Analysis

b. Enrollment Factors

EXAMPLE I
ENROLLMENT ANAL
RUN 1

ANALYSIS OF MATR X
FOR A
6 PERIOD FORECAST

CURRENT DATE
BASE YR. 1965

LINE	DESCRIPTION	BASE	METHOD OF COMPUTA ION
1	POPULATION POOL	76098	DATA80208,82663,87182,87901,86724,92309
2	SIZE OF MARKET	20000	DATA20450,20465,20515,20015,20100,20850
3	PROPENSITY FACTOR	26.3	EQUATION: L2 / L1 * 100
4	PREV. PROPENSITY FACTOR		SHIFT LINE 3
5	PROPENSITY FACTOR CHANGE		EQUATION: L3 - L4
6	PCT CHANGE IN PROPENSITY		EQUATION: L5 / L4 * 100
7	MOVING AVG - PCT CHANGE		AVERAGE OF LINE 6
8	YEAR 1 STUDENTS	3000.	DATA3010,2490,2510,2000,2980,3370
9	SHARE OF MARKET	15.0	EQUATION: L8 / L2 * 100
10	PREV. YEARS SHARE		SHIFT LINE 9
11	CHANGE IN MKT. SHARE		EQUATION: L9 - L10
12	PCT CHANGE IN MKT. SHARE		EQUATION: L11 / L10 * 100
13	MOVING AVG - PCT CHANGE		AVERAGE OF LINE 12
14	OLD YEAR 1 STUDENTS	230.	DATA290,370,380,270,210,230
15	PREV. YEAR 1 STUDENTS		SHIFT LINE 8
16	RATIO-OLD/NEW YR 1 STU.		EQUATION: L14 / L15 * 100
17	MOVING AVG-RATIO YR 1		AVERAGE OF LINE 16
18	TOTAL YEAR 1 STUDENTS	3230.	EQUATION: L8 + L14
19	YEAR 2 STUDENTS	2010.	DATA2570,2690,2470,2640,2050,2750

EXAMPLE I
ENROLLMENT ANAL
RUN 1

ANALYSIS OF MATR X
FOR A
6 PERIOD FORECAST

CURRENT DATE
BASE YR. 1965

LINE	DESCRIPTION	BASE	METHOD OF COMPUTA ION
20	PREV.PERIOD YR 1 STUDENT		SHIFT LINE 18
21	RATIO-YR 2/YR 1 STUDENTS		EQUATION: L19 / L20 * 100
22	PREV.PERIOD RATIO YR2/1		SHIFT LINE 21
23	BLOCK LINE		DATA,1,1,1,1,1
24	CHANGE IN RATIO-YR 2/1		EQUATION: L21 * L23 - L22
25	PCT CHANGE IN RATIO- 2/1		EQUATION: L24 / L22 * 100
26	SHIFT PCT CHG IN RATIO		SHIFT LINE 25 BACK 1 PERIOD
27	MOVING AVG-PCT CHG 2 / 1		AVERAGE OF LINE 26
28	YEAR 3 STUDENTS	1990.	DATA1980,2440,2350,2420,2540,2480
29	PREV.PERIOD YR 2 STUDENT		SHIFT LINE 19
30	RATIO-YR 3/YR 2 STUDENTS		EQUATION: L28 / L29 * 100
31	PREV.PERIOD RATIO YR 3/2		SHIFT LINE 30
32	CHANGE IN RATIO-YR 3/2		EQUATION: L30 * L23 - L31
33	PCT CHANGE IN RATIO- 3/2		EQUATION: L32 / L31 * 100
34	SHIFT PCT CHG IN RATIO		SHIFT LINE 33 BACK 1 PERIOD
35	MOVING AVG-PCT CHG 3/2		AVERAGE OF LINE 34
36	YEAR 4 STUDENTS	1210.	DATA1780,1700,2270,2340,2360,2380
37	PREV.PERIOD YR 3 STUDENT		SHIFT LINE 28
38	RATIO-YR 4/YR 3 STUDENTS		EQUATION: L36 / L37 * 100

EXAMPLE I
ENROLLMENT ANAL
RUN 1

ANALYSIS OF MATR X
FOR A
6 PERIOD FORECAST

CURRENT DATE
BASE YR. 1965

LINE	DESCRIPTION	BASE	METHOD OF COMPUTA ION
39	PREV.PERIOD RATIO YR 4/3		SHIFT LINE 38
40	CHANGE IN RATIO-YR 4/3		EQUATION: L38 * L23 - L39
41	PCT CHANGE IN RATIO- 4/3		EQUATION: L40 / L39 * 100
42	SHIFT PCT CHG IN RATIO		SHIFT LINE 41 BACK 1 PERIOD
43	MOVING AVG-PCT CHG 4/3		AVERAGE OF LINE 42
44	SPECIAL STUDENTS	270.	DATA260,260,190,240,290,240
45	TOTAL ENROLLMENT	8710.	SUM OF LINES 18,19,28,36,44
46	RATIO-SPECIAL TO TOTAL		EQUATION: L44 / L45 * 100
47	MOVING AVG-RATIO S/T		AVERAGE OF LINE 46
48			

EXAMPLE I
ENROLLMENT ANAL

OVERVIEW LINE ANALYSIS

CURRENT DATE
RUN 1

LINE NO.	PLANNING ITEM	1966	1967	1968	1969	1970	1971
1	POPULATION POOL	80208.00	82663.00	87182.00	87901.00	86724.00	92309.00
2	SIZE OF MARKET	20450.00	20465.00	20515.00	20015.00	20100.00	20850.00
3	PROPENSITY FACTOR	25.50	24.76	23.53	22.77	23.18	22.59
4	PREV. PROPENSITY FACTOR	26.30	25.50	24.76	23.53	22.77	23.18
5	PROPENSITY FACTOR CHANGE	-0.80	-0.74	-1.23	-0.76	0.41	-0.59
6	PCT CHANGE IN PROPENSITY	-3.06	-2.90	-4.95	-3.24	1.79	-2.54
7	MOVING AVG - PCT CHANGE	-3.06	-2.98	-3.64	-3.54	-2.47	-2.48
8	YEAR 1 STUDENTS	3010.00	2490.00	2510.00	2000.00	2980.00	3370.00
9	SHARE OF MARKET	14.72	12.17	12.23	9.99	14.83	16.16
10	PREV. YEARS SHARE	15.00	14.72	12.17	12.23	9.99	14.83
11	CHANGE IN MKT. SHARE	-0.28	-2.55	0.07	-2.24	4.83	1.34
12	PCT CHANGE IN MKT. SHARE	-1.87	-17.34	0.56	-18.33	48.37	9.02
13	MOVING AVG - PCT CHANGE	-1.87	-9.61	-6.22	-9.25	2.28	3.40
14	OLD YEAR 1 STUDENTS	290.00	370.00	380.00	270.00	210.00	230.00
15	PREV. YEAR 1 STUDENTS	3000.00	3010.00	2490.00	2510.00	2000.00	2980.00
16	RATIO-OLD/NEW YR 1 STU.	9.67	12.29	15.26	10.76	10.50	7.72
17	MOVING AVG-RATIO YR 1	9.67	10.98	12.41	11.99	11.70	11.83
18	TOTAL YEAR 1 STUDENTS	3300.00	2860.00	2890.00	2270.00	3190.00	3600.00
19	YEAR 2 STUDENTS	2570.00	2690.00	2470.00	2640.00	2050.00	2750.00
20	PREV.PERIOD YR 1 STUDENT	3230.00	3300.00	2860.00	2890.00	2270.00	3190.00
21	RATIO-YR 2/YR 1 STUDENTS	79.57	81.52	86.36	91.35	90.31	86.21
22	PREV.PERIOD RATIO YR2/1	0.0	79.57	81.52	86.36	91.35	90.31
23	BLOCK LINE	0.0	1.00	1.00	1.00	1.00	1.00

EXAMPLE I
ENROLLMENT ANAL

OVERVIEW LINE ANALYSIS

CURRENT DATE
RUN 1

LINE NO.	PLANNING ITEM	1966	1967	1968	1969	1970	1971
24	CHANGE IN RATIO-YR 2/1	0.0	1.95	4.85	4.99	-1.04	-4.10
25	PCT CHANGE IN RATIO- 2/1	0.0	2.45	5.95	5.77	-1.14	-4.54
26	SHIFT PCT CHG IN RATIO	2.45	5.95	5.77	-1.14	-4.54	0.0
27	MOVING AVG-PCT CHG 2 / 1	2.45	4.20	4.72	3.26	1.70	1.41
28	YEAR 3 STUDENTS	1980.00	2440.00	2350.00	2420.00	2540.00	2480.00
29	PREV.PERIOD YR 2 STUDENT	2010.00	2570.00	2690.00	2470.00	2640.00	2050.00
30	RATIO-YR 3/YR 2 STUDENTS	98.51	94.94	87.36	97.98	96.21	120.98
31	PREV.PERIOD RATIO YR 3/2	0.0	98.51	94.94	87.36	97.98	96.21
32	CHANGE IN RATIO-YR 3/2	0.0	-3.57	-7.58	10.62	-1.76	24.76
33	PCT CHANGE IN RATIO- 3/2	0.0	-3.62	-7.98	12.15	-1.80	25.74
34	SHIFT PCT CHG IN RATIO	-3.62	-7.98	12.15	-1.80	25.74	0.0
35	MOVING AVG-PCT CHG 3/2	-3.62	-5.80	0.18	-0.31	4.90	4.08
36	YEAR 4 STUDENTS	1780.00	1700.00	2270.00	2340.00	2360.00	2380.00
37	PREV.PERIOD YR 3 STUDENT	1990.00	1980.00	2440.00	2350.00	2420.00	2540.00
38	RATIO-YR 4/YR 3 STUDENTS	89.45	85.86	93.03	99.57	97.52	93.70
39	PREV.PERIOD RATIO YR 4/3	0.0	89.45	85.86	93.03	99.57	97.52
40	CHANGE IN RATIO-YR 4/3	0.0	-3.59	7.17	6.54	-2.05	-3.82
41	PCT CHANGE IN RATIO- 4/3	0.0	-4.01	8.36	7.03	-2.06	-3.92
42	SHIFT PCT CHG IN RATIO	-4.01	8.36	7.03	-2.06	-3.92	0.0
43	MOVING AVG-PCT CHG 4/3	-4.01	2.17	3.79	2.33	1.08	0.90
44	SPECIAL STUDENTS	260.00	260.00	190.00	240.00	290.00	240.00
45	TOTAL ENROLLMENT	9890.00	9950.00	10170.00	9910.00	10430.00	11450.00
46	RATIO-SPECIAL TO TOTAL	2.63	2.61	1.87	2.42	2.78	2.10

EXAMPLE I
ENROLLMENT ANAL

OVERVIEW LINE ANALYSIS

CURRENT DATE
RUN 1

LINE NO.	PLANNING ITEM	1966	1967	1968	1969	1970	1971
47	MOVING AVG-RATIO S/T	2.63	2.62	2.37	2.38	2.46	2.40
48							

EXAMPLE I
ENROLLMENT ANAL

ENROLLMENT FACTORS

CURRENT DATE
RUN 1

LINE NO.	PLANNING ITEM	1966	1967	1968	1969	1970	1971
3	PROPENSITY FACTOR	25.50	24.76	23.53	22.77	23.18	22.59
5	PROPENSITY FACTOR CHANGE	-0.80	-0.74	-1.23	-0.76	0.41	-0.59
6	PCT CHANGE IN PROPENSITY	-3.06	-2.90	-4.95	-3.24	1.79	-2.54
7	MOVING AVG - PCT CHANGE	-3.06	-2.98	-3.64	-3.54	-2.47	-2.48
48							
9	SHARE OF MARKET	14.72	12.17	12.23	9.99	14.83	16.16
11	CHANGE IN MKT. SHARE	-0.28	-2.55	0.07	-2.24	4.83	1.34
12	PCT CHANGE IN MKT. SHARE	-1.87	-17.34	0.56	-18.33	48.37	9.02
13	MOVING AVG - PCT CHANGE	-1.87	-9.61	-6.22	-9.25	2.28	3.40
48							
16	RATIO-OLD/NEW YR 1 STU.	9.67	12.29	15.26	10.76	10.50	7.72
17	MOVING AVG-RATIO YR 1	9.67	10.98	12.41	11.99	11.70	11.03
48							
21	RATIO-YR 2/YR 1 STUDENTS	79.57	81.52	86.36	91.35	90.31	86.21
24	CHANGE IN RATIO-YR 2/1	0.0	1.95	4.85	4.99	-1.04	-4.10
25	PCT CHANGE IN RATIO- 2/1	0.0	2.45	5.95	5.77	-1.14	-4.54
27	MOVING AVG-PCT CHG 2 / 1	2.45	4.20	4.72	3.26	1.70	1.41
48							
30	RATIO-YR 3/YR 2 STUDENTS	98.51	94.94	87.36	97.98	96.21	120.98
32	CHANGE IN RATIO-YR 3/2	0.0	-3.57	-7.58	10.62	-1.76	24.75
33	PCT CHANGE IN RATIO- 3/2	0.0	-3.62	-7.98	12.15	-1.80	25.74

EXAMPLE I
ENROLLMENT ANAL

ENROLLMENT FACTORS

CURRENT DATE
RUN 1

LINE NO.	PLANNING ITEM	1966	1967	1968	1969	1970	1971
35	MOVING AVG-PCT CHG 3/2	-3.62	-5.80	0.18	-0.31	4.90	4.08
48							
38	RATIO-YR 4/YR 3 STUDENTS	89.45	85.86	93.03	99.57	97.52	93.70
40	CHANGE IN RATIO-YR 4/3	0.0	-3.59	7.17	6.54	-2.05	-3.82
41	PCT CHANGE IN RATIO- 4/3	0.0	-4.01	8.36	7.03	-2.06	-3.92
43	MOVING AVG-PCT CHG 4/3	-4.01	2.17	3.79	2.33	1.08	0.90
48							
46	RATIO-SPECIAL TO TOTAL	2.63	2.61	1.87	2.42	2.78	2.10
47	MOVING AVG-RATIO S/T	2.63	2.62	2.37	2.38	2.46	2.40

B. Enrollment Projection

1. Analysis of Planning Matrix

2. Summary Reports

a. Overview Line Analysis

b. Enrollment Factors

EXAMPLE II
ENROLLMENT PROJ
RUN 2

ANALYSIS OF MATR X
FOR A
6 PERIOD FORECAST

CURRENT DATE
BASE YR. 1971

LINE	DESCRIPTION	BASE	METHOD OF COMPUTA ION
1	POPULATION POOL	92309.	DATA93221,94220,94160,95003,94317,94165
2	PROPENSITY FACTOR	22.59	PERCENT CHANGE OF -2.48 PCT PER PERIOD
3	SIZE OF MARKET	20850.	EQUATION: L1 * .01 L2
4	SHARE OF MARKET	16.16	PERCENT CHANGE OF 3.40 PCT PER PERIOD
5	NEW YEAR 1 STUDENTS	3370.	EQUATION: L3 * .01 L4
6	OLD YEAR 1 STUDENTS	230.	SHIFT .1103 LINE 5
7	TOTAL YEAR 1 STUDENTS	3600.	SUM OF LINES 5,6
8	SHIFT YEAR 1 STUDENTS		SHIFT LINE 7
9	YEAR 2 RATIO	86.21	PERCENT CHANGE OF 1.70 PCT PER PERIOD
10	YEAR 2 STUDENTS	2750.	EQUATION: L8 * .01 L9
11	SHIFT YEAR 2 STUDENTS		SHIFT LINE 10
12	YEAR 3 RATIO	120.98	PERCENT CHANGE OF 4.90 PCT PER PERIOD
13	YEAR 3 STUDENTS	2480.	EQUATION: L11 * .01 L12
14	SHIFT YEAR 3 STUDENTS		SHIFT LINE 13
15	YEAR 4 RATIO	93.70	PERCENT CHANGE OF 1.0, PCT PER PERIOD
16	YEAR 4 STUDENTS	2380.	EQUATION: L14 * .01 L15
17	SUBTOTAL-YR 1-4 STUDENTS		SUM OF LINES 7,10,13,16
18	SPECIAL STUDENT RATIO	2.40	CONSTANT
19	SPECIAL STUDENTS	240.	EQUATION: L20 - L17

EXAMPLE II
ENROLLMENT PROJ
RUN 2

ANALYSIS OF MATR X
FOR A
6 PERIOD FORECAST

CURRENT DATE

BASE YR. 1971

LINE	DESCRIPTION	BASE	METHOD OF COMPUTA ION
20	TOTAL ENROLLMENT	11450.	EQUATION: L17 / .01 L21
21	WORK LINE		EQUATION: 100 - L18
22			

EXAMPLE II
ENROLLMENT PROJ

OVERVIEW LINE ANALYSIS

CURRENT DATE
RUN 2

LINE NO.	PLANNING ITEM	1972	1973	1974	1975	1976	1977
1	POPULATION POOL	93221.00	94220.00	94160.00	95003.00	94317.00	94165.00
2	PROPENSITY FACTOR	22.03	21.48	20.95	20.43	19.92	19.43
3	SIZE OF MARKET	20536.36	20241.68	19727.11	19410.12	18792.06	18296.49
4	SHARE OF MARKET	16.71	17.28	17.86	18.47	19.10	19.75
5	NEW YEAR 1 STUDENTS	3431.51	3497.27	3524.25	3585.51	3589.37	3613.53
6	OLD YEAR 1 STUDENTS	371.71	378.50	385.75	388.72	395.48	395.91
7	TOTAL YEAR 1 STUDENTS	3803.22	3875.76	3910.00	3974.24	3984.85	4009.44
8	SHIFT YEAR 1 STUDENTS	3600.00	3803.22	3875.76	3910.00	3974.24	3984.85
9	YEAR 2 RATIO —	87.68	89.17	90.68	92.22	93.79	95.39
10	YEAR 2 STUDENTS	3156.32	3391.18	3514.61	3605.93	3727.49	3800.98
11	SHIFT YEAR 2 STUDENTS	2750.00	3156.32	3391.18	3514.61	3605.93	3727.49
12	YEAR 3 RATIO	126.91	133.13	139.65	146.49	153.67	161.20
13	YEAR 3 STUDENTS	3489.97	4201.89	4735.77	5148.64	5541.25	6008.73
14	SHIFT YEAR 3 STUDENTS	2480.00	3489.97	4201.89	4735.77	5148.64	5541.25
15	YEAR 4 RATIO	94.64	95.58	96.54	97.50	98.48	99.46
16	YEAR 4 STUDENTS	2347.00	3335.83	4056.47	4617.59	5070.36	5511.57
17	SUBTOTAL-YR 1-4 STUDENTS	12796.50	14804.67	16216.85	17346.40	18323.95	19330.72
18	SPECIAL STUDENT RATIO	2.40	2.40	2.40	2.40	2.40	2.40
19	SPECIAL STUDENTS	314.67	364.05	398.78	426.55	450.59	475.35
20	TOTAL ENROLLMENT	13111.18	15168.71	16615.63	17772.95	18774.55	19806.07
21	WORK LINE	97.60	97.60	97.60	97.60	97.60	97.60

22

EXAMPLE II
ENROLLMENT PROJ

ENROLLMENT FACTORS

CURRENT DATE
RUN 2

LINE NO.	PLANNING ITEM	1972	1973	1974	1975	1976	1977
5	NEW YEAR 1 STUDENTS	3431.51	3497.27	3524.25	3585.51	3589.37	3613.53
6	OLD YEAR 1 STUDENTS	371.71	378.50	385.75	388.72	395.48	395.91
22							
7	TOTAL YEAR 1 STUDENTS	3803.22	3875.76	3910.00	3974.24	3984.85	4009.44
10	YEAR 2 STUDENTS	3156.32	3391.18	3514.61	3605.93	3727.49	3800.98
13	YEAR 3 STUDENTS	3489.97	4201.89	4735.77	5148.64	5541.25	6008.73
16	YEAR 4 STUDENTS	2347.00	3335.83	4056.47	4617.59	5070.36	5511.57
19	SPECIAL STUDENTS	314.67	364.05	398.78	426.55	450.59	475.35
20	TOTAL ENROLLMENT	13111.18	15168.71	16615.63	17772.95	18774.55	19806.07